Gigabit 1000Base-T
to
1000Base- SX/LX Converter

User's Manual

COPYRIGHT

FCC WARNING

This equipment has been tested and found to comply with the limits for class A device, pursuant to part 15 of FCC rules. These limits are designed to provide reasonable protection against harmful interference in a commercial installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communication. Operation of this equipment in a residential area is likely to cause harmful interference, in which case, the user will be required to correct the interference at the user's own expense.

CE

This is a Class A product. In a domestic environment, this product may cause radio interference in which case the user may be required to take adequate measures.

Take special note to read and understand all content given in the warning boxes

Warning

Table of Contents

1 Introduction

About This Guide

Welcome
Thank you for choosing 1000Base-T to 1000Base-SX/LX Converter. This device integrates Fast Ethernet copper and fiber segments in a highly flexible package.

Purpose
This guide discusses how to install and configure your 1000Base-T to 1000Base-SX/LX Media Converter.

Terms/Usage
In this guide, the term "Converter" (first letter upper case) refers to your 1000Base-T to 1000Base-SX/LX Converter, and "converter" (first letter lower case) refers to other converters.

Features

- Complies with IEEE 802.3ab 1000Base-T and 802.3z 1000Base-SX/LX standard
- Optional SC or WDM fiber connectors
- Auto MDI/MDI-X selection for RJ-45 port connection
- Auto polarity correction for RJ-45 Port
- Low power consumption
- Support SC fiber connector for both multi-mode and single mode operations
- Extend fiber distance up to 220m (726 feet) for multi-mode, 10km (33000 feet) for regular single mode, and 80km (231000 feet) for long haul single mode fiber
- NWay setting slide switch
- LEDs for quick and easy device status
- External power supply. Used with Mini Converter Chassis Allows Internal Power Supply Configuration
- FCC Class A & CE approved

Specifications

Standard:	IEEE 802.3ab & IEEE 802.3z
Connector:	1 x fiber optic, 1 x RJ-45
Max. Distance:	Cat. 5 Twisted Pair: 100m (330ft)
	Fiber Optic:
	Multi-mode 220m (726ft)
	Single Mode 10km (33000ft)
	LH Single Mode 80km (231000ft)
Power:	External power supply, 12V
	DC@0.5A
	(Please see Appendix C for
	Internal Power Supply options)
Temperature:	Operating: 0 to 50 Celsius
	Storage: -20 to 70 Celsius
Humidity:	Operating: 10% to 80%RH
	Storage: 5% to 90%RH
Emissions:	FCC Part 15 of Class A & CE approval
Dimensions:	110 x 68 x 23 mm (LxWxH)

Package Contents

The 1000Base-T to 1000Base-SX/LX Converter package
should include:

- One converter
- One AC adapter (for external power supply)
- Four pieces self-adhesive pads
- One user's manual

4

2 Hardware Description

Product Overview

The 1000Base-T to 1000Base-SX/LX switching media converter is primarily designed for larger workgroups, demanding higher speed and broader bandwidth, and requiring migration and expansion from the copper-based Gigabit to Fiber-based Gigabit network.

It features an automatic MDI/MDI-X on the RJ-45 port that allows for direct connection to a workstation, switch or hub. Now, the network manager does not need to worry about the cable configuration (crossover or straight through) when establishing connection between RJ-45 ports.

It features both a RJ-45 jack and a choice of fiber optic connectors which allows it to easily intergrate a 1000Base-T network to a 1000Base-SX/LX fiber network.
This converter only supports full duplex mode for 1000Base-SX/LX fiber port. Set at full duplex, this converter can create potential distances of up to 220 meters for multi-mode fiber, 10 kilometers for regular

5

single mode fiber, and up to 80 kilometers for long haul single mode fiber between networking nodes.

Note: It is not recommended to use the Converter in half-duplex mode as back-to-back distance for multi-mode fiber will only be 412m.
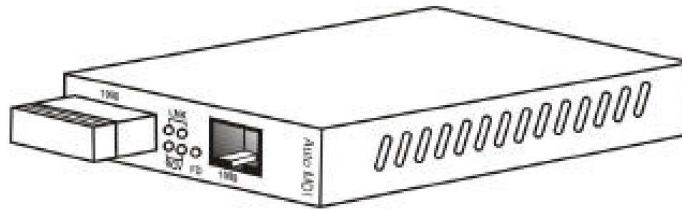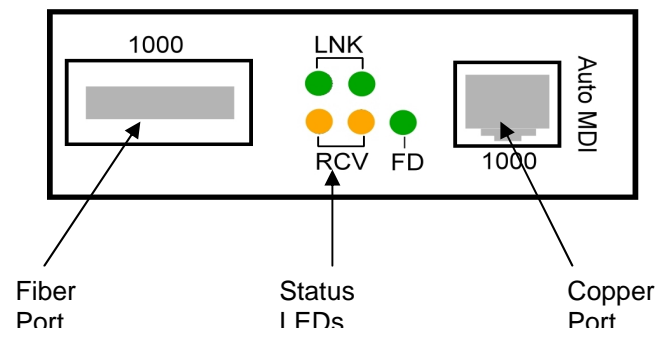

Front Panel View with SC and RJ-45 Connectors
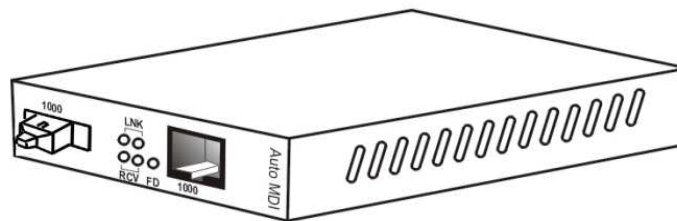
Front Panel View with ST and RJ-45 Connectors

6

Front View

Fiber
Port

Status
LEDs

Copper
Port

7

3 Installation

Installing Your Converter

In this chapter, we will take a look at how to install converters within its operating environment. First, it is important to unpack the Converter and ensure that all the components listed in Package Contents are present.

To install your converter, please see the following procedures:

- Location
- MDI/MDI-X Connection
- NWay Slide Switch Setting
- Installing Converter
- Desktop Installation
- Powering On Unit
- Connecting Fiber Cable
- Connecting Copper Cable

Location

The location selected for installing the Converter may greatly affect its performance. When selecting a site, we recommend considering the following rules:

1. Install the Converter in a fairly cool and dry place. See *Technical Specifications* for the acceptable temperature and humidity operating environments.

2. Install the Converter in a location free from strong electromagnetic field generators (such as motors), vibration, dust, and direct exposure to sunlight.

3. Leave at least 10cm of space at the front and rear of the unit for ventilation.

4. Affix the provided rubber pads to the bottom of the Converter for grip, and to protect the case from scratching.

Auto MDI/MDI-X Connection

The auto MDI/MDI-X on the RJ-45 port alleviates the worry of cabling configuration when connecting the converter with a 1000Base-T device. Whether connecting to a switch, LAN card, or other network device via the RJ-45 port, simply plug and go!

NWay Slide Switch Setting

Use the NWay slide switch to activate NWay operations for the fiber segment.

Factory NWay slide switch default set to ON position. Check that the networking device to be connected to the Converter has NWay support.

If **YES**: Check that the NWay slide switch is set to the ON position. The converter will automatically set half or full-duplex mode on the fiber segment with a transmission speed of 1000Mbps.

If **NO**: Set the NWay slide switch to the OFF position. When NWay is turned off, the default transmission modes for the fiber segment are **full duplex at 1000Mbps**.

Notes:
A   Setting the NWay mode is feasible while the media converter is "on-line"
B   If you experience the following problems, please check if the NWay switch is properly set.

10

1. The LNK (link) LED is not lit and the connection cannot be established
2. The LNK LED is lit and the connection is ok, but cannot transmit or receive data
3. The Converter functions properly for a while, then, it does not work. And then it works after powering off and then on again.

1000BASE-T Port

The 1000BASE-T port supports network speed of 1000Mbps, and operate in full duplex transfer mode. This port also offers automatic MDI/MDIX crossover detection that gives true "plug and play" capability - just plug-in the network cable to the port and the port will adjust according to end node device. The RJ-45 connector is suitable for UTP cable Category 5.

1000BASE-SX/LX Port

The 1000BASE-SX/LX port adds a fiber Gigabit Ethernet link to your network device. Compliant with IEEE 802.3z, this port transmits data at 1000Mbps in full duplex mode across distances of up to 220m over multi-mode fiber-

optic cable. The fiber port has NWay support with a choice of fiber connector types SC and WDM.

Desktop Installation

Follow the instructions listed below to install the Converter onto a desktop location.

1. Locate the Converter in a clean, flat and safe position that has easy access to AC power.
2. Affix the four (4) self-adhesive rubber pads to the underside of the Converter.
3. Apply AC power to the Converter. (The green PWR LED on the front panel should light).
4. Connect cables from the network partner devices to the ports on the front panel. (The green LNK LED on the front panel associated with the port should light).

This converter can also be mounted on a vertical surface. Simply use the underside of the unit as a template to measure and mark out the position of the holes on to the surface where the unit is to be installed. Then use the two screws provided to mount the converter firmly in place.

12

⚠️ **Warning** **Please exercise caution when using power tools. Also, install this unit away from damp or wet locations, or in close proximity to very hot surfaces. These types of environments can have a detrimental effect on the converter and cables. An ideal location is a lightly cooled place such as a typical equipment room.**

Powering On Unit

The Converter uses external power supply 12V DC at 0.5A, frequency 50~60 Hz.

1. Insert the power cable plug directly into the receptacle located at the back of the device.
2. Plug the power adapter into an available socket.
3. Check the front-panel LEDs as the device is powered on to verify that the Power LED is lit. If not, check that the power cable is correctly and securely plugged in.

Note: For International use, you may need to change the AC power adapter cord. You must use a power cord set that has been approved for the receptacle type and electrical current in your country.

Connecting Fiber Cable

When connecting fiber cable to a 1000BASE-FX port on the Converter, be sure the correct type – SC or WDM - connector is used. Follow the steps below to properly connect fiber cabling:

1. Remove and keep the fiber port's rubber cover. When not connected to a fiber cable, the rubber cover should be replaced to protect the fiber optics.
2. Check that the fiber terminators are clean. You can clean the cable plugs by wiping them gently with a clean tissue or cotton ball moistened with a little ethanol. Dirty fiber terminators on fiber optic cables will impair the quality of the light transmitted through the cable and lead to degraded performance on the port.
3. Connect one end of the cable to the SC/WDM port on the Converter and the other end to the SC/WDM port on the other device.

4. Check the corresponding port LED on the Converter to ensure that the connection is valid. (Refer to the LED chart in next section)

Note: **When inserting the cable, be sure the tab on the plug clicks into position to ensure that it is properly seated.**

⚠ Warning **Because invisible laser radiation may be emitted from the aperture of the fiber port when no cable is connected, avoid exposure to laser radiation and do not stare into the open apertures.**

14

Connecting Copper Cable

The 1000BASE-T RJ-45 Ethernet port fully supports auto-sensing and auto-negotiation.

1. Insert one end of Category 5 twisted pair cable into an available RJ-45 port on the Converter and the other end into the port of the network node.

2. Check the corresponding port LED on the Converter to make sure that the connection is valid. (Refer to LED chart in next section)

4 LED Indicators

LED Table

This converter has LED indicators located at the front of the device. The LEDs have been designed to give easy at-a-glance network status, and provides 'real-time' connectivity information. Please see below for an interpretation of their functions:

LED Indicators		
LED	**Condition**	**Status**
PWR	On (Green)	Converter is receiving power
	Off	Power off or failure
LNK	On (Green)	Link established with compliant device
	Flashing (Green)	Data traffic passing through port
	Off	No link established
FD	On (Green)	Port is operating at full-duplex
	Off	Port is operating at full-duplex
RCV	On (Amber)	Receiving data packets
	Flashing	Receiving data packets at a slower rate
	Off	No data packets received

16

Appendix A

Cables

The following are some recommendations as to what you should and should not do when installing cables. Remember - cables are the deciding factor in network performance.
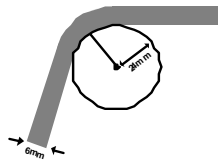
Try to maintain a bend radius of (min.) 4x the diameter of the cable for UTP and 100x for fiber.

Try not to allow the cable to twist too much - this creates a strain on the internal cables.

Place cable ties at regular intervals - do not over tighten cable ties - try to avoid using with fiber.

Do not stretch the cable especially on corners, in vertical cable trays and when spanning long distances.

17

Appendix B

About RJ-45 Cables

When connecting your network devices, use standard Category 5 eight-way cables for 1000Base-T configurations. The pin assignments are as follows:

Pin   1   TD+   Pair   2   White/Orange
Pin   2   TD-   Pair   2   Orange/White
Pin   3   RX+   Pair   3   White/Green
Pin   4   N/A   Pair   1   Blue/White
Pin   5   N/A   Pair   1   White/Blue
Pin   6   RX-   Pair   3   Green/White
Pin   7   N/A   Pair   4   Brown/White
Pin   8   N/A   Pair   4   Brown/White

Application	Cable Type	Application
Converter to Converter or Network Adapter	Straight-through Cable	Converter End Hub 1 ←————————→ 1 2 ←————————→ 2 3 ←————————→ 3 6 ←————————→ 6
Converter to Switch	Cross-Over Cable	Converter End #1 Converter End #2 1 ← →1 2 ← ╳ →2 3 ← ╳ →3 6 ← →6

18

Appendix C

Mini Converter Chassis

The Mini Converter Chassis was developed to accommodate just one media converter. The chassis provides protection for converter units and an option of AC or DC power supplies. Now, network designers can plan their Ethernet, Fast Ethernet, ATM, or Gigabit networks without having to worry about the power source. Furthermore, its unique sizes allow it to be installed in locations where space is limited.

Features

- Simple and easy to install
- Adds fiber connectivity to otherwise copper based networks
- Supports 10/100/1000Base, copper, fiber, single/multi-mode converters with, RJ-45, ST, SC, MT-RJ, VF-45, LC, WDM connectors
- Accommodating one media converter
- Suitable for all size of networks in all locations
- Provides internal AC or DC switching power supply
- Made from high quality durable steel
- Optional external redundant power adapter

Affixing Brackets

We have supplied 2 special panels that easily attaches to the Converter. This allows for the secure placement of the converter into the Chassis. It also seals off the front panel and allows the Chassis to function correctly.

Step 1   Using a Phillips screwdriver, remove two screws from the side panels on the converter.

Step 2 place the converter and brackets on a flat horizontal surface as illustrated above. Secure the brackets by replacing the screws.


Ensure that the rails are flush-mounted with the underside of the converter. The converter is now ready for loading into the Chassis.

20

Installing the Converter

Once the Converter has been attached to the bracket, it can be installed into the Chassis. Special care must be taken to ensure the correct mating of the power connector. Align the converter so that it fits between the upper and lower guide rails.

⚠ **Warning** Always ensure that the converter power socket is positioned at the base of the Chassis. Never force the Converter into the Chassis - check power socket position and alignment.

21
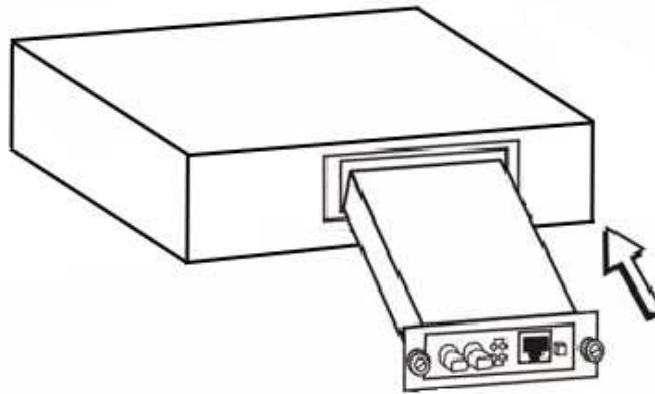
Rear view of Chassis and specifications

Rear View of Chassis with AC Power Supply

Power: 90 - 240V AC (Optional 12V Adapter)
Dimensions: 109 x 174 x 44.3 mm (L x W x H)

Rear View of Chassis with DC Power Supply

Power: -48V DC (Optional 12V Adapter)
Dimensions: 109 x 174 x 44.3 mm (L x W x H)

22

Appendix D

Application Diagram

To effectively expanding a Gigabit Ethernet network, position two converters back-to-back as illustrated.
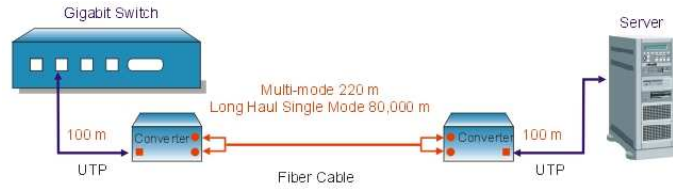
Application Diagram I
In the figure below, the Converter is functioning as a high-speed bridge between switches creating increased capacity for each user (node) on the local area network. It is providing a 1000Mbps full duplex link to a variety of Gigabit Ethernet network devices within a LAN.

23
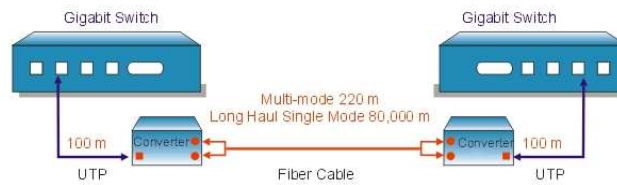
Application Diagram II

In the figure below, the Converter is functioning as a server aggregation for an enterprise or LAN configuration. It can provide a 1000Mbps full-duplex link to workgroups of 10/100 switches located on separate floors within a single building.

Application Diagram III

In the figure below, the Converter is functioning as a high-speed dedicated link within a campus network configuration. It is providing a 1000Mbps full duplex link to a remote networking node.

24